

FRASC Meeting Summary

Attendees: Mark Rosenberg (FRAP), Rebecca Ferkovich (FRAP), Mark Wenzel (CAL/EPA), Fraser Shilling (UC Davis), Kelly Larvie (FRAP), Chris Keithley (FRAP), Stephen Smith (NRCS), Jim Quinn (UC Davis), Rich Walker (FRAP), Jim Spero (FRAP), Justin Johnson (FRAP), David Bakke, Tim Robards (Spatial Informatics Group), Clay Brandow (CALFIRE), Ken Scharfer (NRCS), Elli Cohen (PRBO), Greg Gusti (UC), Jim Quinn (UC), Tom Moore (NRCS), Steve Brink (CFA), Michael Perrone (DWR), Julie Griffin-Platter (SNC), Jerry Bird (USFS), Tiffany Meyer (FRAP), Ken Shaffer (DFW), Jon Gustafson (NRCS), Richard Bode (ARB), Toby Perry (Stewardship Council), Jacqui Gaskill (NRCS), Ray Sauvajot (NPS), Chrissy Howell (USFS), Klaus Scott (ARB), David Graber (NPS), Nick Kunz (SWRCB), Nic Eastill (SNC), Ceci Dale-Cesmat (NRCS), Webster Tasat (ARB), Roy Peterson, John Melvin (CALFIRE), Nancy Hughes (CA UFC), Bruce Goines (USFS), Tony Mediati (CALFIRE), Rebecca Fris, Erin Chappel (DWR).

I. Agenda

9:00 – 9:30: Introduction and Overview

- Introduction of all participants
- FRAP and FRASC process
- Meeting Topic and Goals
- Climate Change in the 2010 Assessment
- California Adaptation Strategy

9:30 – 10:40: Panel Speaker Presentations and Discussion

- Ellie Cohen (President and CEO, PRBO Conservation Science)
- Dave Graber (Chief Scientist, Pacific Western Region of the National Park Service)
- Chrissy Howell (Regional Wildlife Program Leader, US Forest Service Region 5)
- Klaus Scott (California Air Resources Board, Forest Sector GHG inventory)

10:40 – 10:50: Break

10:50 – 11:50 Group Discussion

- Data Sources and Methods for Emissions Inventory
- Climate Change Impacts and Vulnerability Assessments.
- Climate Adaptation Strategies for Forestry

11:50 – 12:00 Recap

- Summary - review of meeting discussions; next steps
- Questions and comments
- Next FRASC meeting date and topic

II. Introductions and Overview

- A. Rich Walker (FRAP) began with an introduction of what FRAP is and how FRAP's Assessment of Forest and Range is now also used by the USFS as per the 2008 USDA Farm bill. He discussed past meetings of FRASC and gave a brief overview of the content of the 2010 Forest and Range Assessment Climate Chapter as follows:

- FRAP has adopted an "All Lands Approach" – we assess state, private, and federal lands

- The 2010 Assessment used a Climate Threat Index derived from a downscaled global climate models which compared predicted changes in climate grouped by Bailey's USDA ecological units.
- The 2010 Assessment used an MC1 Vegetation dynamics model to assess changes at time steps between 2010 and 2100
 - Coarse resolution for local use, ok for statewide – finer resolution data in progress
- Using the MC1 vegetation dynamics model, the 2010 Assessment looked at potential impacts to forest carbon from
 1. impacts from wildfire
 - a. Increasing temps
 - b. Prolonged fire season.
 - c. Smoke impacts
 2. Insects outbreaks
 3. Water resources
 - a. Projected decrease in snowpack
 - b. Sierras – southern sierras affected much
 - c. Predicting vegetation response.
 4. Development
 - a. Expected loss in ranges under two scenarios.
 - b. Impacts/Changes to WUI
 - c. Models are divergent in predictions especially in later decades.
- 2010 Assessment looked at forest vegetation response to climate change using Biomove from UCSB
- Analysis of Asset + Threats = Priority landscape output.

B. Indicators are important in the next assessment.

- Indicator suggested: Net Carbon Sequestration
 - Metric 1: Carbon in live trees (sequestration)
 - Metric 2: Emissions from Natural processes.
 - Metric 3: Storage in wood products and landfill.
- Indicator would remain constant, but underlying data may be improved over time.

C. CA Readiness report (Climate Adaptation being developed by Natural Resource Agency)

- Prepare a broad range of strategies and action to prepare for impact of climate change
- Update to 2009 California Adaption Strategy Report
- Adaptation strategy for range of topics, to be released spring 2013
- Draft Strategy goals:
 1. Promote Healthy and resilient urban and natural forests.
 2. Identify forest vulnerabilities to climate impacts.
 3. Reduce wildfire risk and promote fire safe communities.
 4. Reduce risk of Urban Heat Islands and Air pollution.

Question: (Graber) What factors are included in BioMove model?

Answer: (Keithley) Biotic factors – fecundity, etc. – No edaphic factors in the BioMove model (soil depth, etc.)

III. Panel Discussion

A. Ellie Cohen – PRBO

- Overview of PRBO. To prevent total climate chaos, must engage in mitigation and adaptation simultaneously
- Climate smart conservation principals
- Mitigation – reduce GHG emissions and enhance carbon sinks.
- Adaptation – reduce risk and adapt to climate change impacts on the human and natural environment.
- We need healthy ecosystems – how do we bring these concepts together?
 - Through “Climate Smart”
 - Definition: conservation strategies and actions that specifically address impacts of climate change in concert with other threats
 - Climate smart conservation promotes nature-based solutions
- Key principals – decision-making lens
- From CA Agency adaptation update 01 and National Wildlife fund:
 1. Focus actions on future conditions, not the past.
 - Don’t try to stop ecological change
 2. Design actions in an ecosystem or watershed context.
 3. Employ flexible adaptive approaches for timely response to continual change –
 - View mistakes as valuable as successes
 - What works now might not work in the future
 4. Prioritize actions across multiple scenarios for the greatest benefits to wildlife and people.
 - Look at a range of possible futures – helps address uncertainty
 5. Collaborate and communicate across sectors for timely long-term solutions
- Prioritize ecosystem function and ecological diversity over single species goals for multiple benefits
 - Nontraditional approach. Biodiversity is driving the systems to provide fresh water, sink carbon, and promote biodiversity
- Climate Smart examples:
 - Meadow Restoration
 - Meadows to store, purify, cool, and slowly release water
 - Fuel reduction and some high severity fire
 - Create habitat mosaic, increase fire resilience, restore ecological health
 - Prescriptive grazing and other ecofriendly practices created re-watered rangelands
 - Example: NRCS project in Upper Stony Creek
 - Water, carbon, biodiversity and the bottom lines enhanced.
- In Summary:
 - Climate Smart is ecologically sound

- Climate change is happening; practice climate smart conservation daily to reduce GHG emissions. See the five key principals above.
- For agency folks: follow the Ten% rule. Test and Experiment Now!

B. Dave Graber- National Park Service

- NPS is responding Organizationally:
 - Fed Agencies – progressive leadership
 - Office of Climate Change – Climate Change Response Strategy
 - Adaptation
 - Mitigation
 - Education
 - Science
- Parks put big effort in reducing the carbon footprint they have
 - A teaching moment
 - Modest research budget – not much available for this at NPS
 - No real direction to Park Managers regarding adaptation
- Recent Response Action Plan release by NPS
- Immediate future
 - Enhance workforce climate literacy
 - Engage youth and families
 - Develop effective planning frameworks and guidance
 - Provide climate change science to parks
 - Foster robust partnerships
 - NPS isolated from other fed agencies
 - “Islands in time” were the old mental image – fewer tools to assist in collaboration.
 - Apply appropriate adaptation tools and options
 - Strengthen communication
 - Leopold report of the 1950 -1960’s and 70’s
 - More contemporary update recently that takes change and new research into account.
 - Preserving unimpaired national parks is an impossible mission.
- Landscape conservation coops are the best hope from the NPS perspective (Graber). Why?
 - Connecting large landscapes of natural habitat is a key strategy, LCC does this
 - Climate science research institutions
 - Review and enhance research agendas – a very young field still – much research may be of little use in these early stages, these will/should improve. The message from these will be gloomy

C. Klaus Scott- California Air Resource Board

- Overview
 - Represents the GHG inventory shop, other main area of expertise is criteria pollutants

- Klaus calculates wildfire emissions for ARB
- Enabling legislation (2006) AB 1803, AB 32
- 1990 target from scoping plan
- Purpose of inventory to document emissions from major sectors of the economy, including forestry
- Report annual emissions for all major sectors of the state economy
- Uses
 - Set 2020 emissions limit
 - Track emissions trends
- Data sources:
 - Mandatory facility GHG reporting.
 - State and federal agency data and research
- Emissions inventory sector on forest, range and other lands
 - Estimate annual land atmosphere GHG exchange over forest, range and other lands statewide
 - Atmospheric flow approach (IPCC)
 - CO₂ uptake and emission net CO₂ flux
 - CH₄ and N₂O emission
 - Emission process (combustion, decay)
 - Emissions from wood products.
 - CA forest origin products vs. imports is a key issue, too
- GHG inventory update: forest, range, and other lands
 - Current estimates based on a legacy of research products limited in scope (CEC) - this is being replaced by their new work
 - Initiated process to improve inventory
 - Forest GHG research symposium in Oct 2009
 - Follow up discussions (ARB, CALFIRE/FRAP)
 - Developed contract to improve and update the inventory.
 - Project started September 2011
 - Team UCB, NPS, USFS
 - Technical work group – ARB, CalFIRE – FRAP, Cal EPA, CECI FS
 - Integration FIA MODIS, LANDFIRE, Harvdst, Fire, Other.
 - Flux developed at ecosystem levels
- Products
 - Land CO₂ uptake, emission , net flux,

- CH₄, N₂O Emissions by process (fire, decay, etc)
 - Wood product emissions (CA forest origin vs. imports)
 - CEC project looking at dead biomass is related
 - Other concurrent work
 - Forest GHGs and disease/pests
 - FRAP urban forestry.
- D. Chrissy Howell- USDA-Forest Service Region 5
- USFS wildlife program leader.
 - Adaptation project for the Sierra Nevada – an overview:
 - A way of discussing vulnerability
 - Funded by CA LCC
 - All lands project
 - Goal: develop large scale vulnerability assessment and associated adaptation strategies for focal resources of the Sierra Nevada.
 - Led by CA LCC and EcoAdapt and GEOS Institute in collaboration with USFS R5 and PSW
 - Lots of partnerships and stakeholders.
 - Sierra Nevada is the geographic scope.
 - Timeline now - 2014
 - Objectives:
 - Assess the vulnerability of a suite of focal resources to climate change
 - Use spatial analysis and experts to prioritize conservation challenges
 - Identify implementable management responses to climate change in Sierra Nevada
 - Workplan:
 1. Convene science and stakeholder group.
 2. Develop common list of focal resources FS developed initial list
 - Stakeholder advisory committee to revise this list.
 - Focus is wildlife and plant communities.
 - Where do coarse filters work vs. fine scale info is needed
 3. Hold vulnerability assessment workshop (March 5 -7, 2013)
 - Pre workshop
 - Literature review
 - Downscaled climate data exposure
 - Workshop
 - Basic vulnerability assessment training
 - Identify management decisions.
 - Use expert elicitation process to assess vulnerability of focal resources
 - Post workshop
 - Post products on line
 - Workshop support page for all materials

4. Spatial analysis (CBI to create maps to facilitate the development of adaptation approaches).
5. Adaptation planning workshop scheduled for May 2013
 - Review VA and spatial analyze results
 - Provide basic adaption training
 - Develop adaptation strategies and prioritize areas or actions
 - Identify approaches that extend across boundaries as well as complementary action opportunities
6. Finalize products
 - Online resources of VA findings
 - Narratives, scores, peer-reviewed resources
 - Comparative maps
 - Online resource of adaptation strategies for focal resources and the region
 - Workshop support pages, presentations, etc.

IV. Open discussion and Panel responses to questions

A. *Environmental Impacts*

Question: Climate change may amplify stressors to forest ecosystems such as invasive species, insect pests and disease, drought, and wildfire. Which stressors or which changes to disturbance regimes in forests will represent the greatest challenge to maintaining healthy forests? Please discuss any data or analytical approaches that the State should invest in to better understand these processes.

- **Response** from Dave Graber
 - An obvious change is snowpack being diminished
 - New species will show up without precedent.
 - Acceleration of conifer tree mortality all over the west due to:
 - Insects
 - Drought
 - Completion
 - Fire
 - Etc.
 - Biggest issue – new stressors and interactions that we cannot predict
 - Over and over we hear fire frequency will go up and intensity increase
 - But eventually, in a huge fire, the fuel will run out
- **Response** Chrissy Howell:
 - Base change in precipitation and temperature, extreme events flood, drought etc.
 - Fire is a real concern
 - Analytical approaches: niche modeling to see where plant and animal will go in future.
 - Careful interpretation needed to use this tool
- **Response** Ellie Cohen:
 - Data - need more in the field monitoring
 - Identify suite of indicators in each bioregion.
 - Extirpated birds are a good indicator
 - Look not just for carbon, but ecosystem processes.

- **Response** Klaus: monitoring for degree days.
- **Comment** from Steve Smith
 - Incentive programs focus on
 - Threatened systems
 - Should they focus on ponderosa pine in the Sierra? Big or small not always the issue.
 - NRCS: given conflict between natural systems evolved under fire and the need to control emissions for air quality – this may be the biggest challenge
 - How do we do things in current regulations vs. where we should be focused on new regs.? Look to the future and address those problems
 - Indicators – role of fire in the environment. Bs reg control of that environment.
- **Comment** from Howell: Natural systems:
 - Many areas where unnatural buildup of biomass – need facilities to handle this material in a climate smart way.
 - Enhance forest productivity
 - Burning has impacts
 - Needs to be made economically feasible
 - Provide additional benefits.
 - How will we convince agencies and public
 - How to embrace biodiversity vs. species-centric planning for climate change
 - Monitoring systems being put in place but no money to carry this research/monitoring effort on
 - Not enough support to keep the teams put together for specific questions... these go away after the work is done. How do we continue to maintain the capacity we develop as a part of short term funding
 - No enough discussion of ecological processes
 - How will CA get folks to focus on biodiversity, water, and carbon all at the same time?
- Response from panel: Carbon market example - cap and trade may take a long time to realize, but will bring in \$\$ to fund monitoring and research in the future.
- In the short term, we are on the climate cliff. How to transition and change policies to address these issues.
- Conservation of ecosystems is discussed but is often driven by single species.
- We can make better use of citizen scientists. They work cheaper.
- **Question** from Fraser Shilling: Big picture of assessments and indicators.
 - What is the best way to convey info about indicators
 - Are we beyond the capacity of public to understand and make sense of issues and potential actions
 - Do we soften the doom and gloom message?
 - How do we realistically address this issue and make sense and encourage the public to take appropriate action?
 - Too big a problem to know how to address – is it?
- **Response:** it is bad, but how bad? How do communicate about it?
- **Response** from Ellie Cohen:

- Science has the obligation to tell the truth, even if it is gloomy.
 - But we do have an opportunity to make a difference in a way we never have before. Keep the message simple and offer a solution with a bit of optimism.
 - One example: re-watering range lands through meadow restoration – we can re-create streams that were once there, and keep them there, creating fresh clean water, sinking carbon, and creating habitat and species diversity.
 - Resiliency
 - Case studies from history – restoration of landscapes show us the way and provide a positive story.
- **Comment** from Steve Brink:
 - Forest are overly dense
 - Existing science – pinyon pine type in the Sierra is moving up-slope – impacts can now be observed. 300 feet elevation movement (for pinyon pine) in 75 years.
 - Problem – we manage our systems in a static way... e.g. ID spotted owl nest, draw circle 300 feet and protect it then walk away...
 - Bottom line -- scientists and managers are a new stressor
- **Comment** from Greg Giusti: funding
 - Forests in CA can generate money
 - Incorporate how harvesting can be used to raise money and demonstrate mitigation and adaptation strategies. Show the public the good work.
 - Policies can be road.
 - FRAP – be provocative – show how adaptive management can really have an impact. FRAP has an opportunity to be less esoteric. Time to say we are in the midst. FRAP is the one to say this. Establish CA as a leader and show others how to move the ball forward.
- **Comment** from Michael Perrone (DWR):
 - How do we answer this in a way public and politicians understand – how do we hear the “so what” to convince water providers that biodiversity really is the way to monitor this issue and to improve biodiversity through their actions. Services to people will motivate what they need
- **Comment** from John Melvin (CALFIRE)
 - 95 percent of population in CA is urban – these people are not interested in supporting natural resource planning. They don’t feel connected to natural resources outside of urban areas.

B. Natural System Response

Question: Resilience is an important goal for forests in adapting to impacts from changing climate. What measures or actions do you think are needed most to make our forests more resilient to climate change? What are the best ways to protect vulnerable species and maintain healthy forest habitats? How should we be prioritizing between vulnerable versus resilient species?

- **Response** from Ellie Cohen:

- Vulnerability studies look at threats to the individual species in a system.
 - If we focus on the individual, we may miss the system
 - Suggestion: manage for the system, not for an individual species.
 - Species mix may change
 - In 50 years, half of the systems will be completely different due to changes in habitat, timing, arrival, food sources.
 - Best hope is to manage from the system point of view because species are moving too quickly
 - For example, in a foothill rangeland watershed, manage for water processes and carbon sequestration, not for the snakes and the birds. If you get the water and habitat right, then you are sequestering carbon and providing habitat. We could use a non-native species with long roots as an indicator.
- **Response** from Dave Graber
 - example: the answer is always to ‘thin’ when you talk to a forester. This might work if we use a mosaic. Can improve water yield
 - This is not the only tool
 - For example, montane meadows. Maintained by saturated soils and longevity of this saturation. Check dams would help this, but agencies shy away because it is not a natural way to do restoration
 - We need more specific and useful tools than just ‘thinning’ and meadow restoration.
 - **Response** from Chrissy Howell:
 - Using focal Species is time consuming. We need to move towards habitat types – alpine systems, montane, foothills – this is a coarse filter. Then within each you break out fine filter tools.
 - Drill down on habitats, not just for T&E Species.
 - **Response** from Klaus Scott:
 - vulnerable species may be screened for genetic traits. For example, the edge of their range may be more similar to the future and we might try to encourage these and nurture them.
 - New lands – land acquisition. (both new tools)
 - **Comment** from Roy Peterson:
 - To Dave and Klaus – soil microbiology. If we lose microorganisms we lose everything of higher life (human, mammals, etc.). Soil microbiology is a key example of this. Also be careful when we talk about actual responses and where we are actually seeing these.
 - Careful about using weather vs. climate – they are not exactly the same. Solutions for microbiology?
 - **Comment** from Rich Walker:
 - What about the idea of “Triage”?
 - Is this a viable strategy? What things are robust to change? What are sensitive to change? What are lost?
 - Most managers are too pessimistic. No tools, no money.
 - We need to fix this. – somewhat fatalistic.

- **Comment** from Kevin Schaffer (DFW)
 - Most managers feel like they can't do anything due to current regulations, and they don't have money to do anything.
 - Permanent changes = 5-10 year plans are reasonable? Choose your landscape. Get folks to buy in, take action. Practitioners need to be able to try things on the landscape. But we see too many law suits.
 - CWHR – what are the habitat elements we need in an area, and then we have a chance to manage for biodiversity. A problem: managers are not rewarded for experimentation. We should be able to train to these tools. There is too much fear about taking the wrong action.
 - We need disturbance, because those are the high biodiversity areas. But creating disturbance, or even allowing disturbance, is a risk for the managers.

- **Response** from Chrissy Howell
 - Some examples exist (of areas of experimentation): Sagehen research, Quincy Library Group
 - Plans based on research from these have generated good work.
 - Implementation needs to be improved (economics problem in some cases)
 - Responses – what we can actually do is a correlation exercise. But when the climate changes we know these re-sort. It is not mechanistic, but correlative and these correlations will/are changing.

- **Comment** from Nancy Hughes:
 - Mirrors conversation for Urban climate change issues:
 - Budgets issues are similar
 - Urban heat islands etc. are the problems
 - Existing network in CA of urban forests and they care about trees etc. We can tap into these folks to communicate with the public. They have relationships with the public. “Smokey in the hood”
 - Funding and policy changes.
 - Make maintaining existing urban forests, plant trees, improve air local quality of life, etc. a USFS doctrine (comment from Chrissy Howell).

- **Comment** from Steve Smith:
 - Citizen Scientist idea - urban forest nexus. People can act and feel empowered and this is a real way to collect data and teach people about forests and climate change. If it is collecting data, or otherwise, this can make a difference.
 - Citizen scientists are also inclined to support the science and understand and take action.

- **Comment** from Ellie Cohen (building on Steve Smith's comment): she advocated the idea of “Climate Leader” for a neighborhood, or a precinct. Climate precinct leaders can win and give awards for most changed, best data, etc. Can give encouragement and guidance to their area about mitigation and adaptation.

- **Question for FRAP** from Ellie Cohen:
 - How will the new assessment look at this?

- Can we be more of a policy guiding document?
- Can we challenge folks to think in new ways about climate change?
- How could we be different than other govt. assessments?
- **Response** from Chris Keithley:
 - One of the Farm bill requirements is to develop a strategies document. This is one area where we can take a more provocative look at actions to move forward
 - Climate readiness report is another tool that could be used to address policy and potential actions that would be outside the box.
 - **Comment** from Dave Graber – if we advocate we lose some credibility as a purely scientific report.
 - We should focus on the facts to be believed.
 - Can we use the factual document to have the discussion without losing trust?
 - Dave: CWHR comment – most of the features / elements not known

NOTE: Due to lack of time, the discussion period for the following two questions was shortened in comparison with the first two

C. Methods

Question: The Forest and Range Assessment evaluates threats and assets for forest resources through a simplified risk assessment model. Are there approaches that could be taken to better represent statewide resources that are vulnerable to climate change? How have you managed appropriate scale of analysis and the idea of scaling up and down when needed?

- **Comment** from Klaus: as climate shifts we see more extremes and this lends to argument.
- **Comment from Klaus and Chrissy:** look at the range (variance) of the data points, not the average or mid-point.
- **Comment** from NRCS: Climate soil organisms and time. Cannot ignore impacts on microbiology if we want to do systems approach. Soil health is the key to sustaining this process. This should be an overarching strategy for restoration or predicting changes on the landscape. Keep this in the forefront of our minds. Process not individual outcomes. An adaptation strategy.

D. Mitigation

Question: Through carbon storage and avoiding excessive losses forests have the potential to mitigate greenhouse gas emissions. Which forest management activities or policies offer the greatest potential for promoting carbon storage? What constraints are preventing the benefits from being realized? Also, discuss any data or analysis methods that you feel the state should consider pursuing to better understand carbon storage and the dynamics of carbon pools.

- **Response** from Chrissy Howell:
 - Forest Conservation, stand improvement, reforestation, afforestation.
 - More urban forests

- **Comment** from Mark Wentzel regarding protocols of cap and trade
 - Offsets can be outside the cap sectors.
 - 4 of these: Urban forestry, USFS forests, livestock digesters (high global warming gasses (control of these?)).
- **Comment** from Dave Graber:
 - We need to identify where the carbon is – a long way to go on this topic. How much carbon? Estimates vary widely in sequestration science.

E. *Monitoring*

Question: What monitoring and/or performance measures do you see as being most important for the state to conduct carbon accounting in the forest sector? Also, discuss any considerations that should be given to regional, state, and national reporting of carbon storage.

- **Response** from Klaus Scott
 - How to advance this science? Forest Inventory and Analysis (FIA) program should continue
 - Monitoring is expensive, with limited resources, but going forward.
 - The more we integrate ground monitoring with remote sensing the better.
 - Question – what are appropriate time scales for monitoring?
 - Complicated by carbon storage
 - Follow the Monitoring rule: Sample intensively initially, and then understand the noise and we can figure out appropriate frequency.
 - Ecosystem monitoring occurs at different resolutions.
- **Comment** from Fraser Shilling
 - There is an analog in water plan. DWR is using a “water footprint” as a tool to create a water budget. This looks at the water used in goods and services we use. Similar to carbon budget concept. Sets the context for forest and range stock and flux measurements. The displacement of this footprint to another part of the global – ie. imports – we have not addressed the problem. Need to understand this context.
- **Comment** from Klaus Scott:
 - Carbon dynamics.... Which processes to monitor? Disturbance vs. no disturbance processes. These may have different monitoring needs and cycles.
- **Comment** from Greg Giusti:
 - Time has come for CA to realize it is only regulating a fraction of forest types – only commercial forest lands, not ‘non-commercial forests’. We need to implement regulation on these forests also – including oak woodlands.
 - Rangeland and Ag – if they are using Federal money they should be required to promote forests on this land, i.e. hedgerows.
 - Look at the regulatory environment – what options do we have with current investments to encourage the afforestation efforts in appropriate areas? This could be done through incentives and regulations. This is low hanging fruit. Be imaginative and look to improve.
- **Comment** from Nick Enstice:

- Landscape-scale management and collaboration. We need good faith and trust is needed and we do not have this. We need to build the trust we have so actions can be implemented without litigation. We need good faith and trust with the public and stakeholders as we make mistakes in moving forward.
- **Comment:** (Kevin Schaffer?)
 - Land managers are very constrained to many sensitive ecosystems, such as riparian areas and grasslands. Planting in these areas is very hard due to water regulations such as lake and stream bed alteration permits.
 - To establish veg on those sites, we would need contract periods that extend beyond just 3-years = a 10 year view is needed and we have few incentives to landowners to take the longer view.
 - It can be cost prohibitive.
- **Comment** from Steve Smith
 - Mitigation comment: we have been successful at fuel breaks where the fire stopped, and we saved carbon. How do we show this effectiveness? Performance measures. We need to use these stories to demonstrate we have made successes and these are reasonable tools. We need to do a better job telling these stories.
- **Comment** from Chrissy Howell
 - We need the public to help tell these stories due to the trust issue.
 - How do we give credit for these actions?
 - Restoration has come up many times today. Can we all agree restoration is good? How do we get consensus and tell the benefits for all systems, not just forests.